WORKING PLAN

OF THE

BAMONPOKRI FOREST

OF THE

DARJEELING DISTRICT, BENGAL.

Prepared under the surpervision of the Conservator of Forests

BY

MESSRS. CHESTER AND FRENCH.

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CHAPTER I.

GENERAL DESCRIPTION AND STATISTICS.

(1) *Administrative Circumstances and Legal Status.*

Situation.

1. The Bamunpokri forest is situated at the lower extremity of a spur of the Himalayas extending in a southerly direction from the hills.

It is in the Kursong sub-division of the Darjeeling district, and lies to the right of the road from Siliguri in the plains, *viâ* Pankabari, to Kurseong and Darjeeling.

Origin.

2. This tract of land is the property of Government. It is situated in the area which was originally ceded to the British Government with Darjeeling by the Raja of Sikkim, and, after the military expedition of 1850, taken and retained. It forms part of the large tract of forest land generally known as the Darjeeling Terai, then very sparsely inhabited. At some early date it was leased by Government as waste land to Mr. C. H. Barnes with other similar areas, and, having been resumed by Government on account of arrears of rent, it was in 1867 made over by Government to the Forest Department in their letter No. 2647 of 2nd July 1867 to the Conservator of Forests, Bengal, for the purposes of forest conservancy.

The area has throughout remained unchanged at 1,372 acres. It was a "Government Forest" under the Forest Act of 1865, and the rules of 1867 issued by the Local Government under that Act. In the notification of 23rd January 1879, it was declared a "Reserved Forest" under section 34 of Act VII of 1878 (the Indian Forest Act).

This forest has throughout been free from the exercise of rights, though there is no record of an actual enquiry under Chapter II of the Forest Act. (Reference letter No. 302 Camp, of 7th March 1886, from the Conservator of Forests, Bengal, to the Secretary to the Government of Bengal, Revenue Department, Forests.)

Some time prior to the resumption of this forest from Mr. Barnes, the forest on the lower plateau near the southern boundary, part of Block V Marionbari, had been cleared, it is understood by Mechis, for cotton cultivation. This land was afterwards planted with teak between the years 1867 and 1879.

Boundaries.

3. The Bamunpokri forest, which contains an area of 1,372 acres, is bounded on the north by a demarcated line from the Rangsung river to the Rakti river, separating it from the portion of the Pankabari Tea Estate known as Mount Pereira; east, by the Rakti river; south, by a demarcated line from the Rakti river to the Rangsong river, separating the forest from the Marionbari Tea Estate; west, by the Rangsung river.

The demarcated line forming the north boundary is fixed by five boundary pillars, consisting each of a post surrounded at the foot by a pile of stones. Their positions are shown on the map. The line forming the southern boundary is similarly marked with posts and dry rubble masonry.

Areas enclosed in the boundaries, but excluded from the provisions of the working plan.

4. The Bamunpokri forest is a "high timber" forest of sál mixed with other trees. The few open spaces are the following:—

The swamp known as Bamunpokri, about	...	...	11 acres.
The inspection bungalow compound ...	...	...	3 "
The Forest Ranger's bungalow compound	...	...	3 "

Besides the above have been excluded from the productive area of this working plan:—

A plantation of bamboos in block IV	...	...	2 acres.
A plantation of India-rubber, mostly in block IV		...	1 "
Total		...	20 "

Area of working circle.

5. The area to which this working plan applies is 1,030 acres; the whole Bamunpokri forest comprising as follows:—

Bamunpokri working circle			1,030 acres.
Open spaces comprised within the limits of the above circle, but not included in above acreage			20 „
Pankabari working circle			104 „
Scarps and river beds—			
bordering Rakti block	37 acres.		
„ Selim „	54 „		
„ Pankabari circle	93 „		
„ Pokri block	34 „		
	—		218 „
Total Bamunpokri forest			1,372 „

A map is annexed.

Adjoining estates.

6. Except on the south, where tea has been planted out up to the boundary, the forest is surrounded by land under forest belonging to the neighbouring tea estates.

Charge.

7. The Bamunpokri forest is in the immediate charge of a Forest Ranger who, with one guard, lives on the spot near the southern boundary.

In addition to this forest, he has two of rather smaller areas at a few hours' distance.

During the dry season he entertains five patrols to watch for fires in the surrounding country and to give him notice and to enforce the rules forbidding lighting and carrying of fire except on the two sites set apart for camping. At his head-quarters is situated a pound built by the Forest Department, and now under the management of the Deputy Commissioner, and this enables him to prevent grazing—a practice against which the whole of this forest is closed. The forest is also closed to shooting during the season December to June.

(2) *Physical Conditions.*

Configuration of ground.

8. The Bamunpokri working circle, situated, as above stated, on a spur between the Rangsung river on the west and the Rakti on the east, consists in its upper part of a plateau at an elevation of about 1,500 feet above sea level and 800 feet above the level of the surrounding plains, and has a gentle slope towards the south.

To the south of this upper plateau a slope, with a rather steep gradient, leads to a second plateau which forms the southern part of the forest about 600 feet below the upper. These plateaux are bounded on either side by precipitous slopes descending to the broad stony beds of the above two small streams.

Aspect.

9. Generally speaking the whole forest has a gentle slope towards the south. In the upper plateau a stream—the Bamunjhora—takes its rise, and, cutting for itself a steep ravine-like bed, works its way southward.

Climate.

10. The climate is perhaps best described in the absence of statistics by saying that the forest is at the foot of a spur which rises rather abruptly on its north to a height of from 4,000 to 5,000 feet. On the east it is similarly sheltered by a second spur larger than its own, but on the south and west the far-stretching plains, about 700 feet above sea level, which now contain little forest, leave it exposed. It is the native home of the sál and chilauni (Schima Wallichii).

No figures are available for the rainfall in the forest. The average fall for the years 1882 to 1885 at the factory of the tea estate, situated a few hundred yards from the southern boundary of the forest and surrounded with land under tea, was 114 inches, of which over 85 per cent. fell during the four

months June to September. The figures kindly furnished by the Manager are as follows :—

	1882.	1883.	1884.	1885.	Average.
January	.....	.....	.....	.....	.....
February	.....	.....	.....	.....	.....
March	.....	.....	0·50	3·20	0·92
April	.....	.....	8·27	0·22	2·12
May	13·27*	11·76*	9·78	3·50	9·58*
June	29·83	17·42	19·49	23·07	22·45
July	30·57	21·04	18·07	30·80	25·12
August	48·18	39·34	19·47	22·76	32·44
September	14·29	11·66	14·93	28·02	17·23
October	11·56	1·94	1·46	2·15	4·28
November	.....	.....	.....	.....	.....
December	.....	.....	.....	.....	.....
Yearly total ...	147·70	103·16	91·97	113·72	114·14

* These figures for 1882 and 1883 show the totals up to the end of May, and not merely the fall during that month. The rainfall n the forest is probably somewhat larger than is shown by the above figures.

The winds are never very violent. The south wind prevails during the seeding time of the principal trees, February to June: consequently the order of the fellings should be as far as practicable from north to south.

Soil.

11. Gneiss forms the underlying rock. The sub-soil, consisting of this rock more or less disintegrated according to locality, when mixed with mould and kept covered, makes a good deep soil of a sufficiently loose character. Generally the humus is deep; in places, however, the soil is shallow, and the rock is exposed at intervals.

The lower plateau consists of a rich alluvial deposit several feet in thickness, with the same underlying rock.

The surface of the ground under the shelter of the forest is generally covered with a thin coat of dry leaves and with long grass.

General description of forest crop.

12. The forests, as a whole, may be described as an irregular high forest of mixed species.

As a result of its former treatment on the permit system, the more accessible portions have been deprived of their fine trees, and those of the more favourite species, such as toon, dabdabbi and lampatia. The southern portion was at one time cleared for cultivation and afterwards planted up with teak and a little toon.

The crop is irregular, but forms a more or less complete canopy. In block I, for example, which is, generally speaking, the oldest of the five, the average number of trees of one foot in diameter and over exceeds 40 per acre; trees of smaller diameter are plentiful and natural regeneration is good.

List of trees.

The principal indigenous trees are the following: —

Sál	Shorea robusta (forming less than 8 per cent. of the crop).
Chilauni	Schima Wallichii.
Saj	Terminalia tomentosa.
Toon	Cedrela Toona.

Including the accessory trees, the forest contains the following; the trees are arranged approximately in the order of the numbers in which they occur:—

Sidha	Lagerstrœmia parviflora.
Tatri	Dillenia pentagyna.
Chilauni	Schima Wallichii (used for timber).
Sál	Shorea robusta (used for timber).
Kumbi	Careya arborea.
Goehlo	Callicarpa arborea.
Udal	Sterculia villosa.
Bahera	Terminalia belerica.
Saj	Terminalia tomentosa (used for timber).
Sealposra	Grewia vestita.
Sinduri	Mallotus philippinensis.
Jamun	Eugenia Jambolana.
Koiral	Bauhinia variegata.

Parari ...	...	Stereospermum chelonoides.
Kala siris ...	..	Albizzia stipulata.
Kubindi ...	...	Eriolæna sp.
Swanikat ...	...	?
Dabdabbi ...	...	Garuga pinnata (in great demand for tea-boxes).
Maidal ...	...	Randia dumetorum.
		&c., &c.

Others occur in smaller quantities, such as lampatia (Duabanga) and toon, both in great demand for tea-boxes. The former, though now rare, was originally plentiful in this forest, but has been cut out for tea-boxes. All those not used for timber are used for fuel, except in the case of Udal. Among the species introduced artificially is teak, of which block V is a plantation.

In appendix 1 will be found a table containing the result of an enumeration of all trees of 1 foot in diameter and over in block I, which shows the relative sizes of the above-named trees as well as their relative numbers. It may be noted that the flora of the northern portion of the forest, which has been excluded from the Bamunpokri working circle, differs considerably from the above.

Bamboos and minor produce.

13. With regard to produce other than wood, bamboos are not plentiful in the areas included in the Bamunpokri working circle, and the continued protection of the forest from fire since 1876 has to a great extent suppressed the khur grass, but there still remains a considerable quantity. Climbers are numerous. The principal large ones are the Bauhinea Vahlii, Mimosa sp., besides several others of the genus Ficus.

(3) *Economic Conditions.*

Demand.

14. The forest is called on to supply timber for tea-boxes and fuel. The demand of the neighbouring tea estates for these products greatly exceeds the capability. Thatch-grass and bamboos also command a ready sale. These products are usually sold on tender, a call for tenders being circulated among neighbouring planters early in October. The tender, for which special forms are provided, contains certain conditions as to delivery, removal, payment, &c., to which the tenderer is required to agree.

The quantity of produce removed during the last few years is given below. A market could easily be found for more than the forest can afford, and the absence of a working plan and a correct estimate of the capability of the forest has not allowed of the outturn being regulated by the capability. At present the chief demand is for fuel and for tea-boxes; but there is little doubt that as the forests on the tea estates are cleared and the introduction of drying machines and the use of coal diminish the demand for firewood, the principal demand on the Government forests will be for timber for building and for tea-boxes; and it is in view of this demand, combined with that for fuel, that the forest should be organised:—

Year.	Trees sold on permit.	Other timber removed.		Bamboos.	Fodder grass.	Thatch-grass and other minor produce.	Remarks.
		Cubic feet.	Maunds firewood.				
					Rs.	Rs.	
1878-79	42	.....	5,090	1,700	68	150	The volume of a tree sold on permit is probably 250 cubic feet.
1879-80	41	554	1,516	25	88	217	
1880-81	90	155	28,135	6,700	71	331	
1881-82	104	115	53,100	9,290	92	363	
1882-83	71	650	57,002	7,255	48	362	
1883-84	87	300	5,747	7,808	80	295	In this year were also removed 2,389 poles and 111,600 stakes.
1884-85	44	40	11,335	3,382	58	7	
1885-86	4	.....	5,025	2,507	63	2	

The prices which trees sold singly on permit for sawing have realised are as follows:—

		Rs.	A.	P.
Since 1883-84, trees of group A, Rs. 25 each, or per cubic foot ...		0	5	0
" " " B " 20 " " " " ...		0	4	0
" " " C " 15 " " " " ...		0	3	0
" " " D " 10 " " " " ...		0	2	0
" " " E " 5 " " " " ...		0	1	0

except that since 1886-87 inclusive lower rates per cubic foot have been charged with the object of inducing purchasers to remove fallen timber, and have been—

	Rs.	A.	P.
Group A	0	2	6
„ B	0	2	0
„ C	0	1	6
„ D, E	0	1	0

Group A contains tún.
„ B „ sál.
„ C „ saj, panisaj, lampatia, simul, sissu, chilauni, gamhari, mandania, kimbu, kainjal, mainakat, malagiri, saur, goguldhup, kawala.
Group D—Other trees which usually reach six feet girth.
„ E—Small trees which do not usually reach six feet girth.

The firewood in this circle has realised per 100 maunds from Rs. 5-8 to Rs. 3 8 when sold on tender standing to be cut and removed by the purchaser.

It is recommended that in future no tender of less than Rs. 5-8 be accepted. The bamboos, D. Hamiltonii, when sold on tender, generally realise from Rs. 50 to Rs. 58 per 1,000. These have similarly to be cut and removed by the purchasers.

Price of labour.

15. The following are a few of the rates paid for works:—

Clearing fire-traces, 4 annas per 20 square luggees (1 luggee=12 feet).
Burning cut jungle on fire-traces, Rs. 3 to Rs. 4 per mile in length. Cutting creepers, 1 anna to 1½ annas per acre where the creepers are abundant, and less in other places.
Fire patrols, during the season at 4 annas a day.
Temporary huts for the fire patrols, Rs. 4 each.
Coolies on daily labour, generally 4 annas a day.

Thinnings are executed by daily labourers and cleanings should be similarly executed.

The work of felling and cutting up the trees sold is executed by the purchaser.

Buildings.

16. Besides the houses of the Forest Ranger in charge and of his guard, which are situated near the southern boundary of the forest, there is an inspection bungalow situated at the southern edge of the upper plateau overlooking the Terai.

Communications and outlets.

17. There is at present but one carting road, which starts from the inspection bungalow and runs northwards and then north-east and south round the Bamunjhora, thus tapping blocks I, II, and V, and issuing in the plains on to the trunk road at the south of the forest. There are several riding and foot inspection paths, and the block and compartment boundary lines are also useful for inspection. Carting roads communicating with the Pankabari tea estate, and opening up blocks III and IV, are also desirable and could easily be made.

The nearest railway station is Sukna on the Darjeeling-Himalayan Railway, at a distance of six or seven miles; but for export to the plains the Siliguri station, the terminus of this line and of the Northern Bengal State Railway, which is about seven miles further, would be more convenient, as there is here a break in the gauge.

Roads should be constructed to tap blocks III and IV before the third and fourth periods arrive.

CHAPTER II.

18. DETAILED DESCRIPTION OF COMPARTMENTS.

Name of compartment.	Situation.	Area in acres.	Description of soil.	Description of standing crop.
			The Pokri—Block I.	
A[I]	Upper plateau, south-west aspect.	35	Soil deep, crumbly, plenty of black humus covered with numerous thorny creepers, and the light kind of grass.	Old high forest, canopy complete. Principal trees:—chilâuni, sidha, taki, kumbi and saj. Few toon and sál seed-bearers.
B[I]	Upper platau, west of compartment A.	20	Continuation of A[I] ...	Similar to foregoing, but crop more open.
C[I]	Upper plateau, south of A, south-west aspect.	36	Deep fertile, similar to preceding, but more covered with grass.	Irregular, mixed crop of tatri, sidha, kumbi. Few sál. Few seedlings. The trees in this and the two preceding compartments are considerably older than in the rest of this block.
D[I]	Upper plateau, south of B[I], south-west aspect.	30	Deep fertile and crumbly. Few creepers and only light grass.	Irregular, canopy incomplete, fair proportion of mature trees. Sál somewhat more numerous, chiefly towards west.
E[I]	Upper plateau, south of compartment C, south-west aspect.	40	Soil shallower than in preceding compartments, covered with light grass.	Very irregular mixed forest, chilauni, tatri, sál, kumbi, &c. Sál sufficient. Crop incomplete. Badly shaped poles. Seedlings scarce.
F[I]	Upper plateau, south of D[I], south-west aspect.	30	Soil rather shallow, but fertile, rich and loose humus. Many thorny creepers and thick covering of grass.	Irregular, canopy incomplete, tatri, sidha, chilauni, &c. Sál very scarce; a few on south and west borders, occurring sometimes several together in clumps.
	Total area of Pokri Block	191		

The pokri, the area of which is 11 acres, occurs in this (Pokri) block. It is now planted with Ficus elastica, and is not included in the acreage of this working plan.

			Selim—Block II.	
A[II]	South of Pankabari Forest, forming the southern extremity of the spur. Gentle slope towards south and west, but steep towards east.	40	Soil, deep, fertile; here and there the rock crops up. Covered with thorny creepers which render passage through forest very difficult.	Irregular crop containing, however, more large trees. Poles and saplings insufficient, leaving soil uncovered. Chilauni occurs in very large proportions. Parari, saj, tatri, sidha, gamhari, sál, kumbi occur in small proportions.
B[II]	Upper plateau, south-west aspect, gentle slope.	35	Soil mediocre, humus shallow, covered with khur grass and in places with impenetrable thorny creepers.	Irregular, canopy incomplete. Principal trees chilauni, sidha, tatri, udal, parari. Sál occurs in small quantities in patches. Noticeable amongst the undergrowth are seedlings of toon, chilauni and udal.
C[II] ...	Lower plateau, south-east aspect.	59	Soil good, but superficial; humus shallow. Covered all over with light grass and creepers.	Irregular, canopy interrupted. Large spaces devoid of trees. Few seedlings, little thicket, mostly large trees of chilauni, scattered. Sál fairly represented in eastern portion only.
D[II] ...	Scarp of upper plateau, west of C [II] east aspect.	19	Soil varying, in places good, but in the very steep parts the rock crops up. Many prickly shrubs and creepers; in worst portions bamboos and plantains.	Irregular, canopy incomplete. Far apart are trees and poles of chilauni and sidha, also a few tatri, udal, toon and saj. The soil requires cleaning.

Name of compartment.	Situation.	Area in acres.	Description of soil.	Description of standing crop.
			Selim—Block II—contd.	
EII ...	Scarp of upper plateau, east aspect.	25	Adjoining road, soil good, but superficial. It becomes, however, bad and void of humus, the rock cropping up as the slope becomes steep towards the east. Soil covered with grass and prickly creepers which prevent growth of seedlings.	Irregular, canopy incomplete. Poles of chilauni, sidha, tatri and udal. A narrow slip, adjoining Pokri, which is well stocked, is an exception. Near the stream a few clumps of hill bamboos occur.
FII ...	Lower plateau, south-east aspect.	30	Soil deep, loose, fertile, plentiful covering of dead leaves; except northern portion, which has dense covering of thatching grass, and prickly creepers here and there.	Fairly regular, canopy formed by saplings almost complete. Saplings of sál, kumbi, and chilauni. There also exist several trees and seedlings of sál. Reproduction satisfactorily completed.
GII ...	Ditto ...	17	Soil of good quality, moderately dry, with in general a shallow coating of light humus under the leaves; eastern portion especially covered with thick thatching-grass.	Fairly regular, canopy close. Plantation of teak and toon with natural sál. These occur as saplings, the sál usually dominating. Composition $\frac{6}{10}$ sál, $\frac{6}{10}$ teak, toon, &c.
	Total Selim Block ...	225		
			Garidhura—Block III.	
AIII ...	Scarp of upper plateau, south-west of bungalow site, south aspect.	30	Soil superficial, rocks frequently cropping up, especially in lower portions. Many creepers and light grass. The worst portion having bamboos and plantains.	Irregular, canopy in upper portion complete, consisting of high poles of chilauni, kumbi, tatri; a few lampatia poles and generally very few sál, but in places sâl seedlings are numerous. In lower portion crop incomplete and canopy interrupted.
BIII ..	Scarp of upper plateau, west of AIII, south and south-west aspect.	25	Soil superficial, but moist and fertile, except in upper northern portion, where rocks crop up and vegetation is bad. Traversed by two small streams.	Irregular, canopy incomplete, consisting of poles of goehlo, kala-siris, udal; a very few sál; in places, however, sál seedlings numerous. On the west, adjoining path leading to Pankabari, are a good many bamboos. Discretion must be used in working this western portion, as landslips and degradation of soil are liable to occur.
CIII ...	Scarp of upper plateau continued down from A III.	45	Soil superficial, rocks crop up here and there Few creepers, soil covered with light grass and other inferior vegetation.	Fairly regular, canopy complete. Young trees and high poles of sidha, kumbi, tatri, udal, bahera, kala-siris, dabdabbi, sál only in very small proportions.
DIII ...	Scarp of upper plateau, continued down from BIII south aspect.	50	Soil superficial, moist, moderately fertile, covered with inferior vegetation and thick (khur) grass. Traversed by small streams.	Irregular, canopy incomplete. Young trees and high poles of tatri, simul, kala-siris. Very few sál.
EIII ...	Toe of scarp, continuation of CIII, slope gentle in south-east direction.	20	Soil moderately deep, moist (springs here and there). In south-west portions soil covered with thick thatching-grass and almost impenetrable thorny creepers.	Crop irregular, canopy almost complete, except in south and west. Young poles of sál, goehlo, kala-siris, kumbi, with fair number of sál seedlings. This compartment appears rather young for the third period.
FIII ...	Continuation of DIII. Slope very gentle in south-east direction-less so in east portion.	43	Soil moderately deep, moist, filtering and fertile, covered with thatching-grass on southern portion.	Fairly regular, but canopy much interrupted. Low poles and saplings of kumbi, kala-siris, chilauni and jamun. Sál almost absent.
	Total area of Garidhura block ...	213		

Name of compartment.	Situation of soil.	Area in acres.	Description of soil.	Description of standing crop.
			Marionbari—Block IV.	
A^{IV}	East of Pokri; west part gentle slope towards Pokri; rest of compartment steep east aspect; Bamon Jhora forms south boundary.	30	Soil fairly deep, moist, mediocre quality, covered everywhere with grass, mostly of the light kind, creepers numerous. A few bamboos near stream.	Irregular, canopy complete. Big trees of chilauni especially, also tatri, sidha, kumbi and udal. Under these are saplings, thickets and seedlings of same. No sál appear in this compartment. Reproduction rendered difficult by ravages of wild pig.
B^{IV}	On scarp, east of forest bungalow site, east aspect.	33	Soil of a mediocre quality, varying considerably, being fairly deep in places, rocks cropping up in others. Covered with dead leaves and grass in places.	Very irregular, but canopy complete. Large trees of simul, chilauni, sidha, kumbi, goehlo, poles of jamun, saplings of kala-siris, and seedlings, thickets and saplings of sál.
C^{IV}	Upper plateau south-east of Pokri, north-east aspect.	15	Soil mediocre covered with light grass, few leaves, few creepers.	Crop more or less regular,; canopy incomplete; a few poles of sál, saplings of kumbi, taki, parari, udal, and sidha. Few seedlings of sal and kala-siris.
D^{IV}	Lower plateau slight inclination towards south.	15	Soil good, deep and crumbly, covered with thick grass, thin grass and creepers.	Crop regular, canopy incomplete. Part planted with lampatia, now in state of saplings, saplings of sál, toon in patches, towards the centre especially. In south very poor: bahera also occurs.
E^{IV}	Scarp of upper plateau, south of forest bungalow site.	26	Soil superficial, moderate quality, covered with thin covering of leaves, grass, and prickly climbers.	Crop almost regular, canopy complete, saplings of sál, chilauni, kala-siris, sidha, udal, goehlo, kumbi, dabdabbi, a fair number of seedlings of sál, latikat, and taki.
F^{IV}	Lower plateau, slight slope towards south.	21	Soil, except near stream, of rich quality, humus deep and filtering. Thick undergrowth of thatching-grass and creepers.	A plantation of teak thriving as saplings. Sál, kumbi, goehlo exist as poles, also udal and tatri, more especially as seedlings, also goguldhup covers soil as thicket.
G^{IV}	Lower plateau, very slight slope towards south.	9	Soil good, but covered with creepers, thick grass and inferior vegetation.	Irregular, canopy incomplete, low poles and saplings of sál, goehlo, and a few seedlings of sál, tatri, and udal. The reproduction is not complete and a cleaning of the soil is necessary.
H^{IV}	Lower plateau, very slight slope towards south.	20	Soil as in previous compartment. West portion covered with thick grass; light grass and thin covering of leaves elsewhere; few creepers.	Irregular (except in east, where it is fairly regular). Poles and saplings of goehlo, little sál in south portion, tatri and kumbi. Seedlings of all kinds few; composition $\frac{1}{10}$ sál, $\frac{1}{10}$ goehlo, $\frac{1}{10}$ tatri, kumbi, siris, simul, jamun, &c.
I^{IV}	Lower plateau, very slight slope towards south-west.	32	Soil deep, crumbly, very good, rich black mould. The north-west portion covered with thatching-grass and a few creepers.	Irregular, sál numerous towards centre both as young trees and poles. Elsewhere, saplings and poles of goehlo and tatri predominate. Poles and saplings of sidha, siris, parari, taki, and kubindi.
	Total area of Marionbari	201		
			Rakti—Block V.	
A^{V}	Lower plateau, on south boundary of forest.	30	Soil moderately deep, dry and hard, well covered with leaves little grass.	Plantation of teak. These teak are now flourishing young saplings. Composition $\frac{9}{10}$ teak, $\frac{1}{10}$ sál, $\frac{1}{10}$ toon, goehlo, udal and large trees of semul.

Name of compartment.	Situation.	Area in acres.	Description of soil.	Description of standing crop.
			Marionbari—Block IV.—continued.	
BV	Lower plateau, on south boundary of forest.	44	Soil as in AV, except that being looser it is more fertile.	Crop regular, being a plantation of teak and toon, now flourishing as saplings, overtopped by sál; composition of crop, sál $\frac{4}{10}$, teak $\frac{3}{10}$, toon $\frac{2}{10}$, and $\frac{1}{10}$ siris and miscellaneous.
CV	Lower plateau north of AV.	26	Soil moderately deep, dry, but the thick covering of dead leaves prevents it getting too hard. In north portion plenty of thatching-grass.	Plantation. Saplings of toon, teak and poles of sál overtopping rest; forming a regular crop with complete canopy. Composition $\frac{8}{10}$ teak, $\frac{2}{10}$ toon, dominated by sál poles and young trees.
DV	North of BV ...	20	Soil as in preceding ...	Plantation. Complete, saplings of teak and toon, the toon planted two years later than the teak. Composition $\frac{6}{10}$ teak, $\frac{4}{10}$ toon.
EV	North of CV ...	24	Soil of good quality, moderately dry, in general a shallow coating of humus under the leaves. Little grass and few creepers.	Regular, and canopy close. Plantation of young saplings of teak and toon, overtopped by poles of sál, numerous sál seedlings due to natural reproduction. Composition $\frac{4}{10}$ teak, $\frac{3}{10}$ toon, $\frac{2}{10}$ sál, $\frac{1}{10}$ semul, goehlo, &c.
FV	North of DV ...	22	As in preceding, but more creepers and thatching-grass.	Regular, canopy generally complete. Plantation of teak, sál poles, lampatia saplings. Numerous seedlings of sál. Composition $\frac{6}{10}$ sál, $\frac{3}{10}$ teak, $\frac{1}{10}$ miscellaneous.
GV	North of EV ...	25	As in preceding, but lighter growth of thatching-grass.	Regular, canopy close. Plantation teak, toon. Sál occurs naturally both as saplings and seedlings. Composition sál $\frac{4}{10}$, teak $\frac{3}{10}$, toon $\frac{2}{10}$, miscellaneous $\frac{1}{10}$.
HV	North of FV ...	9	As in preceding, but rank undergrowth especially in north of compartment.	Regular, canopy close. Partly natural, partly plantation of teak and toon saplings; numerous low poles of sál; also saplings and poles of udal, kumbi, tatri, and goehlo. Composition $\frac{6}{10}$ sál, $\frac{4}{10}$ teak, toon, kumbi, &c.
	Total Rakti Block ...	200		
	GRAND TOTAL ...	1,030		

CHAPTER III.

WORKING PLAN OF THE BAMUNPOKRI WORKING CIRCLE.

19. TABLE A.

General Working Plan.

Bamunpokri Working Circle, Area 1,030 acres.

Organised on a rotation of 125 years.

BLOCK TO BE REGENERATED DURING THE

FIRST PERIOD, FROM 1885-86 TO 1909-10.			SECOND PERIOD, FROM 1910-11 TO 1934-35.			THIRD PERIOD, FROM 1935-36 TO 1959-60.			FOURTH PERIOD, FROM 1960-61 TO 1984-85.			FIFTH PERIOD, FROM 1985-86 TO 2009-10.		
Block.	Compartments.	Area in acres.	Block.	Compartments.	Area in acres.	Block.	Compartments.	Area in acres.	Block.	Compartments.	Area in acres.	Block.	Compartments.	Area in acres.
I. Pokri ...	A I	35	II. Selim.	A II	40	III. Garidhura.	A III	30	IV. Marionbari.	A IV	30	V. Rakti...	A V	30
	B I	20		B II	35		B III	25		B IV	33		B V	44
	C I	36		C II	59		C III	45		C IV	15		C V	26
	D I	30		D II	19		D III	50		D IV	15		D V	20
	E I	40		E II	25		E III	20		E IV	26		E V	24
	F I	30		F II	30		F III	43		F IV	21		F V	22
				G II	17					G IV	9		G V	25
										H IV	20		H V	9
										I IV	32			
Total ...		191			225			213			201			200

NOTE.—As explained, the above is the general plan; but as an exception during the first rotation the first period will contain 30 years (1885-86 to 1914-15) and the second period will contain 20 years (1915-16 to 1934-35). In subsequent rotations all periods without exception will contain 25 years each.

		Acres.
Block I	...	191
,, II	...	225
,, III	...	213
,, IV	...	201
,, V	...	200
		1,030

Formation of Working Circle.

20. The forest having to supply timber and fuel to its full capability will be worked as a high timber forest. The northern portion situated on steep slopes must be kept always well wooded with high forest, and this has been marked off as a separate working circle under the name of the Pankabari Working Circle, and will be treated permanently on the Jardinage method.

Bamunpokri Working Circle. Justification of the general working plan.

21. The major portion of the forest has, as above explained, been formed into the Bamunpokri Working Circle, and the physical and economical considerations rendering this course desirable will be transformed from its present state of an irregular forest into a regular forest.

During the course of this transformation, which will take a full rotation, each periodic block will in turn, during the period to which it is affected, be worked over by means of regeneration fellings, destined to produce a young fairly regular crop in place of the old forest removed.

Method of treatment.

22. The working plan prescribes the application of the method of natural regeneration and thinnings.

The method known as Jardinage would perhaps be more suitable to the generality of the forests of this nature at the present stage of forestry; but the large demand for timber and firewood which enables the forest to be worked up to its full capability (in recent years it has been worked far beyond this capability), and the conditions of reproduction and vegetation, have induced the officers entrusted with the preparation of this working plan to prescribe the method of natural regeneration and thinnings.

This method is also the one recommended by the former Divisional Officer, Mr. F. B. Manson, who was intimately acquainted for years with this forest.

Rotation.

23. With a view to working the forest ultimately more largely for timber as distinguished from fuel, and from observations on the rate of growth of some of the principal trees, the circle will be worked on a rotation of 125 years. This will be divided into five periods of 25 years each. The circle has similarly been divided into five periodic blocks. The circle and the blocks are shown on the accompanying map.

General order of working.

24. Block I will be regenerated during the 1st period.

Block	II	will be regenerated during the 2nd period.			
,,	III	ditto	ditto	3rd	,,
,,	IV	ditto	ditto	4th	,,
,,	V	ditto	ditto	5th	,,

25. The rotation of 125 years has been selected chiefly in favour of the sál which is the principal tree, and which, showing a growth of about 10 rings to the inch of radius (if these concentric rings can be accepted as annual rings), requires about this length of time to attain a girth of over six feet.

There are no data for the rate of growth of teak in this forest. If this rotation is too long for most of the trees other than the best, they will be removed in the Jardinage fellings or the periodic thinnings, and the composition of the forest will gradually improve.

The natural regeneration of most of the trees, and particularly of sál, is good and rapid; a period of 25 years will suffice.

The periodic blocks are purposely not of equal area, being approximately inversely proportional to their productiveness.

26. The first rotation of 125 years must be considered a transition-rotation. During subsequent rotations the general plan will be the execution of regeneration fellings in the blocks affected to the different periods, and improvement cuttings in the other blocks. For example—

1st period.—Block I.—Regeneration fellings.
Blocks II, III, IV, V.—Improvement fellings.

2nd period.—Block I.—Improvement fellings.
,, II.—Regeneration fellings.
Blocks III, IV, V.—Improvement fellings.
&c. &c.

During the transition-rotation, likewise of 125 years, to which this plan more especially applies, the general march of operations will be—

1st period.—Block I.—Regeneration fellings.
Blocks II, III, IV.—Jardinage fellings.
Block V.—Improvement fellings.

2nd period.—Block I.—Improvement fellings.
,, II.—Regeneration fellings.
Blocks III, IV.—Jardinage fellings.
Block V.—Improvement fellings.

3rd period.—Blocks I, II.—Improvement fellings.
Block III.—Regeneration fellings.
,, IV.—Jardinage fellings.
,, V.—Improvement fellings.

4th period.—Blocks I, II, III.—Improvement fellings.
Block IV.—Regeneration fellings.
,, V.—Improvement fellings.

5th period.—Blocks I, II, III, IV.—Improvement fellings.
Block V.—Regeneration fellings.

27.

TABLE B.

Special Plan for the first period.

Nature and order of the fellings to be made during the first period from 1885-86 *to* 1914-15.

Compartments.			Summary description of crop.	Nature of cutting.				Remarks.
Blocks.	Compartments.	Area in acres.		Regeneration.	Jardinage.	Improvement.	Creeper cutting.	
I.—Pokri ...	A I ...	35	Mature high forest of sidha, tatri, &c., canopy complete, sál few	Regeneration fellings.	.....	Cleanings ...	Creeper cutting ...	The regeneration of these compartments will be effected in the order A, B, C, D, E, F. One "cleaning" should be made at the time of the primary felling, and cleanings should be made subsequently whenever required.
	B I ...	20	Ditto ditto ditto ditto, sál very few	Ditto ...	.....	Ditto ...	Ditto ...	
	C I ...	36	Ditto ditto ditto ditto, sál few	Ditto ...	.....	Ditto ...	Ditto ...	
	D I ...	30	Irregular high forest, fair proportion of mature trees, canopy incomplete, sál few ...	Ditto ...	.....	Ditto ...	Ditto ...	
	E I ...	40	Ditto ditto ditto ditto ditto, sál sufficient	Ditto ...	.....	Ditto ...	Ditto ...	
	F I ...	30	Ditto ditto ditto ditto ditto, sál few ...	Ditto ...	.....	Ditto ...	Ditto ...	
II.—Selim ...	A II ...	40	Crop irregular, poor, large trees, poles, &c., canopy interrupted	.....	(a) Jardinage fellings.	.....	Ditto ...	(a) The order and annual area of these fellings are fixed in the table D of the cuttings based on area.
	B II ...	35	Ditto ditto ditto ditto, seedlings of toon	.....	Ditto ...	.....	Ditto ...	
	C II ...	59	Ditto ditto ditto ditto, large trees scattered chiefly chilauni.	.....	Ditto ...	(b) Cleanings ...	Ditto ...	
	D II ...	19	Ditto ditto ditto ditto, requires cleaning ...	.....	Ditto ...	(b) Ditto ...	Ditto ...	(b) At once and at intervals of two years, until no longer required.
	E II ...	25	Ditto canopy interrupted, crop poor, except towards west...	.....	Ditto ...	.....	Ditto ...	
	F II ...	30	Crop regular, principally formed by saplings, sál, kumbi and chilauni	.....	Ditto ...	.....	Ditto ...	
	G II ...	17	Ditto, consisting of teak and toon plantation at state of saplings, a few mature sál.	.....	.....	Periodic thinnings	Ditto ...	
III.—Garidhura ...	A III ...	30	Crop irregular, incomplete, few trees, mostly high poles, numerous blanks	.....	Ditto ...	.....	Ditto ...	Creeper cutting is fixed in the table D of cuttings by area. Each compartment will be cut over every three years.
	B III ...	25	Ditto ditto ditto ditto ditto	.....	Ditto ...	.....	Ditto ...	
	C III ...	45	Crop fairly regular, of poles, sál few	.....	Ditto ...	.....	Ditto ...	
	D III ...	50	Crop irregular, canopy incomplete, sál few	.....	Ditto ...	.....	Ditto ...	
	E III ...	20	Ditto ditto crop young for the third block, sál fairly numerous	.....	Ditto ...	.....	Ditto ...	
	F III ...	43	Crop fairly regular, canopy interrupted, sál almost wanting	.....	Ditto ...	.....	Ditto ...	
IV.—Marionbari ...	A IV ...	30	Irregular young high forest and thicket, canopy generally complete, sál wanting ...	.....	Ditto ...	.....	Ditto ...	
	B IV ...	33	Ditto ditto ditto ditto ditto	.....	Ditto ...	.....	Ditto ...	
	C IV ...	15	Ditto ditto ditto ditto incomplete, sál seedlings few.	.....	Ditto ...	.....	Ditto ...	
	D IV ...	15	Ditto incomplete with blanks. Small plantation of lampatia	.....	Ditto ...	.....	Ditto ...	
	E IV ...	26	Fairly regular, consisting of saplings, canopy complete	.....	Ditto ...	.....	Ditto ...	
	F IV ...	21	Plantation of saplings, mostly teak	.....	Ditto ...	.....	Ditto ...	
	G IV ...	9	Crop irregular, incomplete, miscellaneous poles and saplings, cleaning required ...	.....	Ditto ...	(b) Cleanings ...	Ditto ...	
	H IV ...	20	Ditto ditto ditto ditto ditto	.....	Ditto ...	.....	Ditto ...	
	I IV ...	32	Ditto ditto ditto ditto sál plentiful	.....	Ditto ...	.....	Ditto ...	
V.—Rakti ...	A V ...	30	Plantation of teak and toon saplings, sál and toon in small proportion	.....	.....	Periodic thinnings	Ditto ...	The order of the thinnings is fixed in the table D of the cuttings based on area. The eight compartments will be thinned in rotation in the order indicated.
	B V ...	44	Ditto ditto overtopped by sál poles	.....	.....	Ditto ...	Ditto ...	
	C V ...	26	Ditto ditto and other saplings	.....	.....	Ditto ...	Ditto ...	
	D V ...	20	Ditto ditto ditto	.....	.....	Ditto ...	Ditto ...	
	E V ...	24	Ditto ditto ditto ditto with sál poles	.....	.....	Ditto ...	Ditto ...	
	F V ...	22	Ditto ditto ditto ditto ditto	.....	.....	Ditto ...	Ditto ...	
	G V ...	25	Ditto ditto ditto ditto ditto	.....	.....	Ditto ...	Ditto ...	
	H V ...	9	Ditto ditto ditto ditto ditto	.....	.....	Ditto ...	Ditto ...	

28. While adopting in the general plan periods of 25 years, the present condition of the growth on blocks I and II requires that the special plan should prescribe that the first period consist of 30 years instead of 25, and the second period of 20 years instead of 25.

Special plan for the first period.

This will be necessary in the first rotation only, and will not affect the general plan.

29. The annexed table B, "The Special Plan," shows the detailed working during the first period.

30. The tax of the principal fellings (that is the outturn of the regeneration fellings) is fixed on volume, and is given in its appropriate table C as 9,000 maunds.

Principal fellings.

31. The table B prescribes jardinage fellings in blocks II, III, IV. The capability of these will be by area as indicated in table D.

Accessory fellings.

In these fellings during this period no trees, except those that are dead, will be felled.

Each block will be worked over once in ten years.

In block V thinnings are prescribed, generally one compartment a year. The table prescribes the order and the return of the thinning to any given compartment once every eight years.

The thinnings here prescribed will be made departmentally, whether or not the produce can be sold. In the latter case, the saplings cut out will be allowed to decay on the coupe.

They will be made on the principle laid down in this Working Plan.

In the jardinage fellings trees fallen, and those standing which are dead, will alone be removed. After marking they may be sold on tender or on permit. Trees merely dying will not be cut.

The outturn of these thinnings and jardinage fellings will be very small, and no credit is taken for it in fixing the tax (*i.e.*, the quantity of wood which is prescribed to be cut annually).

The same table prescribes the order of creeper cutting which will be executed once every third year in any given area.

Estimation of the growing Stock and of the Annual Capability.

32. The method adopted was the following :—

After a careful study of the compartments and formation of the first periodic block, an enumeration of the trees forming the crop over the whole of this block, compartment by compartment, was executed. The diameter of the trees was measured at breast height, and every tree classed according to species and according to diameter.

The diameter classes were 1·0 foot, 1·2 feet, &c., rising in fifths of a foot, trees between 0·9 and 1·1 feet in diameter being classed as of 1·0 foot, and so on. Trees under 0·9 feet in diameter were omitted and considered as part of the advance—growth. The above figures having been obtained for each compartment, an abstract was made for the block. For each of the species the following calculation was made. The square of the diameter of the class was multiplied by the number of trees in that class, and the sum of these products was divided by the sum of the trees; the square root of the result gave the diameter of the tree of average volume of that species.

This calculation, of course, assumes that the tree of that species of the average diameter is also the tree of average volume.

Having made this calculation for each of the 17 species that occur in considerable numbers in this block, a type tree of each of these species, of this average diameter, and having, as far as the eye could judge, an average form, was selected and felled, the bole was cubed in short sections, generally of six feet length, and the branch wood was cut into firewood, allowed to dry for two* months and weighed. For the trees forming less than one per cent. of the crop, that is, trees of species other than the 17 above referred to, three groups were formed, based on the general size of the trees, trees of one group were considered as of one species, and a similar calculation led to the selection of a type

* The period beyond which fuel is seldom left to dry before weighment and payment by purchasers.

tree for each group. The weight of the bole has been obtained from the volume by multiplying the volume in cubic feet by the weight in lbs. per cubic foot accepted for the corresponding timber, air dried, obtained from this or a neighbouring forest, and the total capability has been fixed in maunds. In a similar manner has been made the calculation of the capability in cubic feet solid.

The details of most of the above calculations are given in Appendix 3.

33. The growing stock on the first periodic block having thus been calculated to be 3,60,000 maunds, the annual capability for the first period will be $\frac{3,60,000}{30}$, or 12,000 maunds.

This working plan prescribes that the "tax," or the amount to be cut out annually in the principal fellings, shall be 9,000 maunds, or 16,000 cubic feet, the balance being allowed to accumulate yearly, and to constitute a reserve fund as prescribed further on.

34. The term "principal fellings" is applied only to "regeneration fellings," and the term "principal produce" to the outturn of these fellings, all other fellings and produce of wood being termed accessory.

35. Determination of the annual yield for the first period—

TABLE C.

Yield of the principal fellings.

Compartments.	Areas in acres.	Number of trees counted.	Contents (estimated). Actual.	Contents (estimated). Future increment.	
			Mds.		
A 1 ...	35	1,886			
B 1 ...	20	1,025			
C 1 ...	36	1,248	360,000*	Neglected...	The reserve fund has been fixed at 90,000 maunds.
D 1 ...	30	1,293			The quantity to be cut during the first period is fixed at 270,000 maunds.
E 1 ...	40	1,098			
F 1 ...	30	1,311			
Total ...	191	7,861	.....	.....	The annual tax, *i.e.* the quantity to be cut annually, $\frac{270,000}{30}$=9,000 maunds (nine thousand maunds).

* The actual figure was 357,379 maunds.

TABLE D.

36. *Ordered and areas of the Improvement and Jardinage cuttings for the first period (special),* 1885-86 *to* 1914-15.

Year.	Compartment to be cut over. By thinning.	Area in acres.	By creeper cutting.	By Jardinage fellings.	Area in acres.	Remarks.
1885-86	A V ...	30		A II ...	40	
1886-87	B V ...	44	(a) ...	B II ...	35	
1887-88	C V ...	26	(b) ...	C II ...	59	
1888-89	D V ...	20	(c) ...	D II, E II, F II ...	74	
1889-90	E V ...	24	(a) ...	A III, B III ...	55	The thinnings here prescribed will be made departmentally, whether or not the produce can be sold. In the latter case the saplings cut out will be allowed to decay on the coupe. They will be made on the principle laid down in this working plan.
1890-91	F V ...	22	(b) ...	C III, D III ...	95	
1891-92	G V ...	25	(c) ...	E III, F III ...	63	
1892-93	H V, G II ...	26	(a) ...	A IV, B IV ..	63	
1893-94	A V ...	30	(b) ...	C IV, D IV, E IV, F IV	77	
1894-95	B V ...	44	(c) ...	G IV, H IV, I IV ...	61	
1895-96	C V ...	26	(a) ...	A II ...	40	
1896-97	D V ...	20	(b) ...	B II ...	35	
1897-98	E V ...	24	(c) ...	C II ...	59	
1898-99	F V ...	22	(a) ...	D II, E II, F II ...	74	
1899-1900	G V ...	25	(b) ...	A III, B III ...	55	In the Jardinage fellings, trees fallen, and those standing which are dead will alone be removed. After marking they may be sold on tender or on permit. Trees merely dying will not be cut.
1900-1901	H V, G II ...	26	(c) ..	C III, D III ...	95	
1901-1902	A V ...	30	(a) ...	E III, F III ...	63	
1902-1903	B V ...	44	(b) ...	A IV, B IV ..	63	
1903-1904	C V ...	26	(c) ...	C IV, D IV, E IV, F IV	77	
1904-1905	D V ...	20	(a) ...	G IV, H IV, I IV ...	61	

TABLE D—*continued.*

Year.	Compartment to be cut over.					Remarks.
	By thinning.	Area in acres.	By creeper cutting.	By Jardinage fellings.	Area in acres.	
1905-1906	E V ...	24	(b) ...	A II ...	40	
1906-1907	F V ...	22	(c) ...	B II ...	35	
1907-1908	G V ...	25	(a) ...	C II ...	59	
1908-1909	H V, G II ...	26	(b) ...	D II, E II, F II ...	74	
1909-1910	A V ...	30	(c) ...	A III, B III ...	55	The outturn of these thinnings and Jardinage fellings will be very small, and no credit is taken for it in fixing the tax (*i.e.*, the quantity of wood which is prescribed to be cut annually).
1910-1911	B V ...	44	(a) ...	C III, D III ...	95	
1911-1912	C V ...	26	(b) ...	E III, F III ...	69	
1912-1913	D V ...	20	(c) ...	A IV, B IV ...	63	
1913-1914	E V, F V ...	46	(a) ...	C IV, D IV, E IV, F IV	77	
1914-1915	G V, H V ...	34	(b) ...	G IV, H IV, I IV ...	61	

(a)		(b)		(c)	
Compartment.	Area.	Compartment.	Area.	Compartment.	Area.
A I	35	C I	36	E I	40
B I	20	D I	30	F I	30
A II	40	C II	59	E II	25
B II	35	D II	19	F II	30
A III	30	C III	45	G II	17
B III	25	D III	50	E III	20
A IV	30	D IV	15	F III	43
B IV	33	E IV	26	G IV	9
C IV	15	F IV	21	H IV	20
A V	30	C V	26	I IV	32
B V	44	D V	20	E V	24
				F V	22
				G V	25
				H V	9
Total ...	337		347		346

CHAPTER IV.

EXECUTION OF THE WORKING PLAN AND SYLVICULTURAL TREATMENT.

37. The compartment lines will be kept well defined and clear to facilitate control.

The limits of each year's coupe (the area over which the cuttings of the year extend) will be laid down so as to remain for several years.

Primary fellings.

38. The regeneration fellings will consist of a primary felling, one or more (generally one) secondary fellings, and a final felling, and they will be executed in this order.

The object of the primary felling will be to slightly open out the canopy by cutting trees at intervals, so that, while keeping the soil sufficiently protected against the sun, loose and penetrable by the roots of the seedlings, and restricting the growth of grass and weeds, there will be plenty of seed-bearers left standing, and the seedlings that exist or may spring up will have the necessary shelter.

After the primary felling is completed, the tops of the trees left standing should appear evenly distributed, allowing the diffused sunlight to reach the soil.

The trees to be cut in the primary felling will consist generally of those of thick cover and low crown.

Trees of species giving good timber, unless unsound, should be left standing and should not be cut till the final felling.

Under a primary felling the soil should be cleaned of weeds and grass. In spots where the canopy is not complete, and where the tree tops do not require opening out, the execution of the primary felling will consist merely in cleaning the surface of the ground of weeds, &c.

Similarly, if the crop of seedlings already existing is complete, the felling will at that spot be more of the nature of a secondary than of a primary felling.

39. The secondary felling, which should follow when the seedlings are sufficiently plentiful and require more light, should merely remove some of the old trees. If it is considered after a first secondary felling that the seedlings require more light, and yet will not bear the complete exposure which would result from a final felling, a second secondary felling should be made, and the final felling be postponed.

Secondary fellings.

40. The final felling will follow when the seedlings have attained the stage of thicket and no longer require shelter. A few good specimens of timber trees, such as sál, toon, and saj, if sound, and likely to attain larger dimensions, should alone be left.

Final fellings.

41. Cleanings shall be made as soon and as often as the seedlings are in danger of being injured by grass or weeds. They will be frequently required in this forest. They will be executed by the guard, or by not more than two coolies at a time, in the presence of the Forest Ranger.

Cleanings.

42. Cleanings in this forest will be executed in the very young crops, and will consist in cutting down or topping off the jungle and plants of an inferior species, which dominate, or threaten to dominate, and thereby endanger plants of a more valuable species The same term is used in this working plan as applying to the case in which, no young crop existing, it will be necessary, as in compartment CII, to cut down the noxious vegetation to allow the seed to reach the ground and the seedlings to establish themselves.

43. Thinnings will be executed as prescribed. The object will be to disengage the tops of the saplings, which are strong and likely to grow into young trees, and to reduce the struggle for existence among trees too crowded.

Thinnings.

The saplings suppressed, or likely to be suppressed, should be cut out. The object being to improve the growth of the crop, these thinnings will be only sufficiently heavy to insure this, and will not be delayed because there is no demand for the outturn. This operation will be executed by the divisional officer himself. The teak should not be favoured to the extermination of other trees. A mixture of species is desirable. The toon should be encouraged, as also other good species.

Creeper cutting.

44. Creeper cutting shall be executed every three years as prescribed.

45. In the jardinage fellings, which will be limited to the areas prescribed in this plan, only fallen wood or trees actually dead will be cut. As these operations pass over the same area every ten years, trees that are dying should await their return. The outturn of these fellings and of the thinning is unimportant, and this wood might well be sold on ordinary permit after marking.

Jardinage fellings.

46. Lampatia and dabdabbi, two trees in great request for tea-boxes, were formerly plentiful in this forest, and have now been nearly all cut out. The seedlings of these species will be specially assisted in the improvement cuttings.

47. No* fellings, except those prescribed, will be made. The issue of permits for trees for timber, except in the coupe of the year, will cease.

* This prohibition does not apply to cleanings, which will be made when the seedling crop requires them.

Grazing.

48. Grazing shall, as now, be prohibited entirely.

49. The forest will be protected from fire as now. It has been successfully protected since 1876. The existing fire traces are shown on the map, and will be cleared annually in November, and burnt in January and February.

Fires.

They are narrow, and would probably not suffice to stop a fire, but they would facilitate counterfiring.

Under a notification of the Local Government, which issues annually under the "Fire Protection Rules" of 28th July 1879, the forest is closed against shooting and hunting, except with the written permission of the Divisional or Sub-Divisional Forest Officer, from 1st December of one year to 1st June of the following.

A notification, issued under the rules of 15th December 1880, forbids the lighting or carrying of fire except on the camping grounds fixed annually by the Forest Officer. These camping grounds are at present two only.

Removal of produce.

50. The conditions under which the produce of this forest is now sold are eight in number and are given below; they were introduced by the Divisional Forest Officer, Mr. F. B. Manson, in 1883.

CONDITIONS.

1. The Forest Department does not bind itself to accept the highest or any tender.

2. All produce must be taken over by the purchaser in the forest, and no claim can be entertained after the produce has been taken over. The purchaser shall give notice to the Forest Officer when he intends to remove the produce made over to him.

3. Before the purchaser commences to cut or collect the produce, a permit in the usual form and with a copy of this tender accepted by the Sub-Divisional Officer attached must be obtained; and further, unless permission to the countrary be given, no portion of the produce for which this tender is accepted shall be cut or collected until it has been marked by a Forest Officer.

4. All trees will be marked close to the ground by a Forest Officer, and if cut more than six inches above the mark the purchaser will be liable to a penalty of—

Two annas	for a	tree under	3 feet	girth at	the base.
Four	do.	do.	4 feet	do.	do.
Eight	do.	trees over	4 feet	do.	do.

5. The Forest Officer will recognise only one agent on behalf of each purchaser of produce in each forest. If several petty contractors are employed, the purchaser must appoint one responsible agent to superintendent the work of the coolies and to see that the rules are obeyed.

6. In compartments where fellings of standing trees are undertaken the work should proceed as near as may be in regular progression, the wood being at once cut up and stacked and the branches collected in heaps. The Forest Officer may refuse to mark more trees or may stop the work until this rule is obeyed.

7. Purchasers should impress on their workmen the obligation of protecting the Forests from fire (*vide* Forest Act, section 25 (b) (c) and Section 78).

In the case of charcoal kilns and other fires allowed to be lighted in the Forest, a space twenty feet broad must be kept clear all around.

8. Purchasers are not entitled to any produce except that described in the permits issued to them. The purchaser of wood for charcoal does not carry with it a right to bamboos for making baskets in which to remove the charcoal, nor of slabs and poles for banking up the kilns; these bamboos, slabs and poles must be paid for.

The purchase of a tree for sawing does not imply permission to cut other small trees to make the sawpits

The Forest Officer in charge should be applied to in all cases, and he will decide whether the produce required may be given gratis or not.

9. No tender will be accepted unless it is drawn up in the prescribed form and unless it is made subject to the above conditions.

Control.

51. In view of the great damage done by the purchasers' workmen, endeavours should be made to introduce the lopping off of the boughs of large trees before they are felled to diminish the damage they do to those left standing and to the young growth. The ranger and guard shall from date be required to cut back carefully with their own hands all injured seedlings on a level with the ground.

This will vastly improve the young growth.

Considering the small area of the forest, the guard in charge of this and the Rakti forest should be required to patrol the whole forest at least once daily, and report having done so to his superior officer.

The forest ranger should, as a rule, patrol the whole forest three times a week, and himself be present as far as possible when any trees are being felled.

When the time for making the annual principal felling arrives, a superior forest officer, assisted by the ranger and guard of the beat, shall himself select the trees for marking for felling. The trees to be felled will be marked, and not those to be reserved. The divisional officer is recommended to use his influence to introduce the use of the saw as a substitute for the axe in cutting up firewood as likely to put a stop to the present waste of probably 20 per cent. of all fuel. It is further recommended that trees marked for felling in the principal fellings when suitable for timber, be marked with a special design and sold by the cubic foot, on tender, or on ordinary permit, and not at a fixed price per tree.

Method of executing the regeneration fellings.

52. The forest crop being irregular, it will often be found that the felling will partake of the nature of a primary felling in one spot, and a few yards off, perhaps, of that of a secondary felling. In the more regular crops, however, these fellings will be distinct, and the following notes should be observed in cutting the quantity of material fixed as the "tax."

Control over outturn.

The order of these fellings has been fixed in the special table (B) for the 1st period. The sylvicultural requirements must be observed.

Primary and final feelings can be delayed if necessary without injury to the seedling crop (advance growth). Areas over which a primary felling may have been made a few (say two to eight) years previously will be found to require a secondary felling to preserve the crop of seedlings; when this is the case this secondary felling will be made first over the area on which the state of the seedlings renders it compulsory and the balance of the "tax," after deducting the outturn of this secondary felling, will be obtained from areas demanding a final felling, and if the tax be still uncut, a primary felling will be executed over the area next in order.

53. It will assist the officer executing the fellings if, while marking the trees for felling in the principal fellings, he notes the number of trees he marks. This will enable him to estimate roughly the quantity of material marked, and prevent his exceeding the "tax."

The fellings will generally march from north to south as prescribed in the special table.

He should traverse a belt of forest parallel to the northern boundary line of his "coupe," and mark the selected trees, at the root on the south side, so as to recognise them in his next traverse parallel to and south of the previous one. He will keep note of the trees marked in a form similar to the following:—

Name of compartment.

Felling of the season 18— 18— .

Secondary felling.

Executed by ——————————, Divisional Officer.

Assisted by ——————————, Ranger.

Date.

Signature.

Trees marked for felling.

Name.	Large.	Medium.	Small.	Remarks.
	Above in diameter.	From to	Under in diameter.	

In the column for remarks a note of the trees sold for timber might be useful.

As a guide it may be noted that the average trees felled as types in the calculation of the stock in preparing this plan contained about 40 to 50 maunds of firewood; large trees, such as those usually felled in regeneration fellings, would weigh say 100 maunds on a rough estimate.

The above register being kept, experience will soon show to what extent the above suggestions should be modified.

54. After the trees have been felled a check counting of the stocks shall be held, the result being recorded in a similar form to the above and compared with the previous.

An additional column should show the number of trees damaged by the felling operations and proceedings instituted or other action taken.

The Divisional Officer is reminded that he is responsible for the complete observance of the conditions of sale as given on the reverse of the tender, and should gradually introduce further conditions with a view to a more effectual protection of the standing crop against damage.

Check on outturn of fellings.

55. As a check on the estimate of the capability, to obviate the danger of the forest being over-worked, the tax has been fixed at three-fourths approximately of the estimated capability. The balance of one-fourth the stock on the first periodic block will constitute a reserve fund, which will provide against the consequences of the succeeding blocks being understocked when the periods for their working arrive—a contingency which is, however, not likely.

This reserve fund will consist partly of good timber trees of sâl, toon and saj left standing after the final regeneration fellings.

56. As a further check on the capability, an enumeration of the growing stock in block I will be made in the year 1897-98 on the same method and with the same diameter classes as the calculation of the capability has now been made, so as to allow of a detailed comparison. When the prescribed time for revising the tax arrives, the officers will take stock in the first periodic block, and after deducting the reserve fund, which will then have accumulated, will fix the tax at three-fourths of the capability calculated on the remainder of the stock. The reserve fund thus accumulated in this first period will be carried through into the second period, and should then aggregate about 90,000 maunds. In all subsequent revisions of the tax, the reserve fund accumulated up to date will in a similar manner be deducted from the stock before the calculation of the capability, and the tax will then be fixed at three-fourths of this capability.

57. The reserve fund will not be cut without the previous approval of the Inspector-General, nor will any deviation from this plan be allowed without his approval. All revisions of the tax should also have his approval.

CHAPTER V.

PORTION OF BAMUNPOKRI FOREST OUTSIDE WORKING CIRCLE.

Pankabari Circle. Area. Position. Necessity of keeping well-wooded.

58. The Pankabari circle of this forest, of an area of 104 acres, forms the northern and highest part of the forest, and owing to its very steep slopes towards the Rakti and Rangsung rivers, must always be kept well-wooded both on account of the shallow nature of the soil and for fear of landslips.

General description of crop.

It is all natural irregular high forest; sâl occurs nowhere except on the very summit of the ridge. There are fine trees of chilauni and large trees of simul here and there; also in smaller quantities trees of saj and dabdabbi. Bamboos occur in considerable numbers in the western portion.

Sections.

59. It has been divided into three sections, numbered 1, 2 and 3 respectively, having the following areas:—

Section 1	...	...	31 acres.	104 acres.
„ 2	...	...	31 „	
„ 3	...	...	42 „	

Section No. 3, forming the northern portion of the circle, contains the steepest slopes and is the poorest of the three, and it is on this account that it has been given the largest area.

Method of treatment.

60. The Jardinage method will be applied, nothing but dead wood being extracted. One section will be at least once carefully gone over every three years, so that the whole circle will have been gone over in nine years. The dead wood thus collected

will be sold on ordinary permit after being marked. The order of working is given in the following table:—

Year.	Section.	Area.	Remarks.
1885-86			
1886-87	I	31	No tax is prescribed, but once at least in three years each section will be gone over and nothing but dead wood extracted.
1887-88			
1888-89			
1889-90	II	31	
1890 91			
1891-92			
1892-93	III	42	It may happen that no dead wood will be found in the area allotted to the year, in which case no wood will be extracted.
1893-94			
1894-95			
1895-96	I	31	
1896-97			
1897-98			
1898-99	II	31	
1899-1900			
1900-1			
1901-2	III	42	
1902-3			
1903-4			
1904-5	I	31	
1905-6			
1906-7			
1907-8	II	31	
1908-9			
1909-10			
1910-11	III	42	
1911-12			

Scarps and river beds.

61. For the scarps and river beds, the positions of which are described in Chapter I, no working plan is prescribed.

Area.

These areas, as shown in Chapter I, amount to 218 acres.

Suggestion.

In working them caution is required, and none but dead trees should be removed owing to the very steep gradients and to the danger of giving rise to landslips on the scarps and to the poor nature of the soil on the flats forming the river beds.

APPENDIX I.

Enumeration of trees in the 1st Periodic Block (Block I).

Names.	Diameter classes.																				
	1·0	1·2	1·4	1·6	1·8	2·0	2·2	2·4	2·6	2·8	3·0	3·2	3·4	3·6	3·8	4·0	4·4	4·6	4·8	5·0	Total.
Sál	137	126	112	95	55	45	34	10	6	...	1	2	...	...	...	1	...	...	...	...	624
Sidha	381	359	338	287	168	87	65	21	14	3	2	1	...	...	...	...	...	...	...	...	1,724
Chilsuni	102	97	103	101	61	47	53	41	22	27	9	8	4	2	...	3	1	1	...	...	682
Tatri	203	176	202	150	91	41	35	13	6	4	2	...	...	...	1	...	...	...	...	...	983
Bahera	74	52	60	39	33	19	14	8	6	6	1	...	...	...	...	1	...	...	...	...	313
Saj	36	45	36	53	33	18	18	10	11	5	1	1	3	...	...	...	...	...	...	...	275
Udal	134	101	68	55	23	34	22	11	7	3	1	2	...	1	1	...	...	...	...	...	468
Kumbi	217	123	109	50	30	11	7	2	...	...	...	...	...	...	...	...	...	...	...	...	549
Sinduri	102	38	13	7	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	163
Scalpoara	144	41	8	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	194
Kirra	33	8	6	6	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	53
Jamun	67	35	34	13	4	2	3	1	1	...	...	...	...	...	...	...	...	...	...	...	160
Goehlo	331	120	31	16	3	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	505
Parari	48	32	23	24	6	6	2	1	1	...	...	...	...	...	...	...	...	...	...	...	143
Mowa	7	2	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	11
Maidal	59	9	4	...	1	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	74
Geio	16	15	13	7	1	2	1	...	1	1	1	3	...	...	...	...	...	...	...	...	61
Dabdabbi	23	11	10	7	4	6	7	4	1	2	...	...	...	...	...	...	...	...	...	...	75
Koiral	87	43	10	2	1	...	...	1	...	...	...	...	...	...	...	...	...	...	...	...	144
Latikat	13	2	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16
Patneiro	25	16	7	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	51
Toon	1	1	1	...	...	1	1	1	1	...	...	...	...	...	...	...	...	...	...	...	7
Gideri	18	15	7	5	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	44
Swanikat	47	20	10	5	5	1	2	2	...	...	...	...	...	...	...	...	...	...	...	...	92
Harra	12	10	5	4	1	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	36
Gambari	4	2	...	2	1	2	...	3	2	1	...	...	...	...	...	1	...	...	...	...	18
Kawala	8	4	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
Rajbirij	19	16	5	3	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	44
Amara	8	2	1	2	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	16
Simul	1	1	2	1	...	...	...	...	...	...	...	1	1	1	1	1	...	...	...	1	11
Kubindi	56	30	11	5	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	102
Panisaj	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Panikat	2	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Sitsal	3	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Malota	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Malla	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	2
Boiral	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Poled	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Wanich	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Baida	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Unnamed	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Hirsut	3	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	1
Kadam	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	3
Ginera	1	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	4
Taki	6	...	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	15
Kalasiris	57	37	17	7	3	2	1	...	1	...	...	...	...	...	...	...	...	...	...	...	120
Safed Siris	8	9	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	15
Patpati	12	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	18
Lampatia	7	1	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	13
Totilla	2	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	0
Total ...	2,582	1,610	1,255	953	536	336	266	129	81	52	18	18	8	4	3	7	1	1	...	1	7,661

APPENDIX 2 (a).

CALCULATION OF THE DIAMETERS OF THE TYPE TREES.

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Sál ...	1·0	1·00	137	137·00	1447·52	2·32	1·52
	1·2	1·44	126	181·44			
	1·4	1·96	112	219·52			
	1·6	2·56	95	243·20			
	1·8	3·24	55	178·20			
	2·0	4·00	45	180·00			
	2·2	4·84	34	164·56			
	2·4	5·76	10	57·60			
	2·6	6·76	6	40·56			
	3·0	9·00	1	9·00			
	3·2	10·24	2	20·48			
	4·0	16·00	1	16·00			
			624				

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Sidha ...	1·0	1·00	81	381·00	3759·76	2·18	1·48
	1·2	1·44	359	516·96			
	1·4	1·96	338	662·48			
	1·6	2·56	287	734·72			
	1·8	3·24	168	544·32			
	2·0	4·00	87	348·00			
	2·2	4·84	63	304·92			
	2·4	5·76	21	120·96			
	2·6	6·76	14	94·64			
	2·8	7·84	3	23·52			
	3·0	9·00	2	18·00			
	3·2	10·24	1	10·24			
			1,724				

APPENDIX 2 (a).—*continued.*

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Chilauni ...	1·0	1·00	102	102·00	2,264·44	3·32	1·82
	1·2	1·44	97	139·68			
	1·4	1·96	103	201·88			
	1·6	2·56	101	258·56			
	1·8	3·24	61	197·64			
	2·0	4·00	47	188·00			
	2·2	4·84	53	256·52			
	2·4	5·76	41	236·16			
	2·6	6·76	22	148·72			
	2·8	7·84	27	211·68			
	3·0	9·00	9	81·00			
	3·2	10·24	8	81·92			
	3·4	11·56	4	46·24			
	3·6	12·96	2	25·92			
	4·0	16·00	3	48·00			
	4·4	19·36	1	19·36			
	4·6	21·16	1	21·16			
			682				
Tatri ...	1·0	1·00	263	263·00	2,100·00	2·14	1·46
	1·2	1·44	176	253·44			
	1·4	1·96	202	395·92			
	1·6	2·56	150	384·00			
	1·8	3·24	90	291·60			
	2·0	4·00	41	164·00			
	2·2	4·84	35	169·40			
	2·4	5·76	13	74·88			
	2·6	6·76	6	40·56			
	2·8	7·84	4	31·36			
	3·0	9·00	2	18·00			
	3·8	14·44	1	14·44			
			983				
Bahera ...	1·0	1·00	74	74·00	775·68	2·48	1·57
	1·2	1·44	52	74·88			
	1·4	1·96	60	117·60			
	1·6	2·56	39	99·84			
	1·8	3·24	33	106·92			
	2·0	4·00	19	76·00			
	2·2	4·84	14	67·76			
	2·4	5·76	8	46·08			
	2·6	6·76	6	40·56			
	2·8	7·84	6	47·04			
	3·0	9·00	1	9·00			
	4·0	16·00	1	16·00			
			313				
Saj ...	1·0	1·00	36	36·00	814·36	2·97	1·72
	1·2	1·44	45	64·80			
	1·4	1·96	36	70·56			
	1·6	2·56	53	135·68			
	1·8	3·24	38	123·12			
	2·0	4·00	18	72·00			
	2·2	4·84	18	87·12			
	2·4	5·76	16	57·60			
	2·6	6·76	11	74·36			
	2·8	7·84	5	39·20			
	3·0	9·00	1	9·00			
	3·2	10·24	1	10·24			
	3·4	11·56	3	34·68			
			275				
Udal ...	1·0	1·00	134	134·00	1077·80	2·30	1·52
	1·2	1·44	101	145·44			
	1·4	1·96	68	133·28			
	1·6	2·56	55	140·80			
	1·8	3·24	28	90·72			
	2·0	4·00	34	136·00			
	2·2	4·84	22	106·48			
	2·4	5·76	11	63·36			
	2·6	6·76	7	47·32			
	2·8	7·84	3	23·52			
	3·0	9·00	1	9·00			
	3·2	10·24	2	20·48			
	3·6	12·96	1	12·96			
	3·8	14·44	1	14·44			
			468				
Kumbi ...	1·0	1·00	217	217·00	922·36	1·68	1·30
	1·2	1·44	123	177·12			
	1·4	1·96	109	213·64			
	1·6	2·56	50	128·00			
	1·8	3·24	30	97·20			
	2·0	4·00	11	44·00			
	2·2	4·84	7	33·88			
	2·4	5·76	2	11·52			
			549				

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Sinduri ...	1·0	1·00	102	102·00	211·44	1·30	1·14
	1·2	1·44	38	54·72			
	1·4	1·96	13	25·48			
	1·6	2·56	7	17·92			
	1·8	3·24	2	6·48			
	2·2	4·84	1	4·84			
			163				
Sealposra...	1·0	1·00	144	144·00	221·28	1·14	1·07
	1·2	1·44	41	59·04			
	1·4	1·96	8	15·68			
	1·6	2·56	1	2·56			
			194				
Kirra ...	1·0	1·00	33	33·00	71·04	1·35	1·17
	1·2	1·44	8	11·52			
	1·4	1·96	6	11·76			
	1·6	2·56	6	15·36			
			53				
Jamun ...	1·0	1·00	67	67·00	265·32	1·66	1·30
	1·2	1·44	35	50·40			
	1·4	1·96	34	66·64			
	1·6	2·56	13	33·28			
	1·8	3·24	4	12·96			
	2·0	4·00	2	8·00			
	2·2	4·84	3	14·52			
	2·4	5·76	1	5·76			
	2·6	6·76	1	6·76			
			160				
Gochlo ...	1·0	1·00	331	331·00	632·08	1·25	1·12
	1·2	1·44	120	172·80			
	1·4	1·96	31	60·76			
	1·6	2·56	16	40·96			
	1·8	3·24	3	9·72			
	2·0	4·00	3	12·00			
	2·2	4·84	1	4·84			
			505				
Parari ...	1·0	1·00	48	48·00	266·24	1·86	1·36
	1·2	1·44	32	46·08			
	1·4	1·96	23	45·08			
	1·6	2·56	24	61·44			
	1·8	3·24	6	19·44			
	2·0	4·00	6	24·00			
	2·2	4·84	2	9·68			
	2·4	5·76	1	5·76			
	2·6	6·76	1	6·76			
			143				
Mowa ...	1·0	1·00	7	7·00	15·84	1·44	1·20
	1·2	1·44	2	2·88			
	1·4	1·96	1	1·96			
	2·0	4·00	1	4·00			
			11				
Maidal ...	1·0	1·00	59	59·00	87·04	1·18	1·09
	1·2	1·44	9	12·96			
	1·4	1·96	4	7·84			
	1·8	3·24	1	3·24			
	2·0	4·00	1	4·00			
			74				
Gelo ...	1·0	1·00	16	16·00	151·40	2·48	1·57
	1·2	1·44	15	21·60			
	1·4	1·98	13	25·48			
	1·6	2·56	7	17·92			
	1·8	3·24	1	3·24			
	2·0	4·00	2	8·00			
	2·2	4·84	1	4·84			
	2·6	6·76	1	6·76			
	2·8	7·84	1	7·84			
	3·0	9·00	1	9·00			
	3·2	10·24	3	30·72			
			61				

APPENDIX 2 (a)—*continued.*

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Dabdabbi	1·0	1·00	23	23·00	192·68	2·57	1·60
	1·2	1·44	11	15·84			
	1·4	1·96	10	19·60			
	1·6	2·56	7	17·92			
	1·8	3·24	4	12·96			
	2·0	4·00	6	24·00			
	2·2	4·84	7	33·88			
	2·4	5·76	4	23·04			
	2·6	6·76	1	6·76			
	2·8	7·84	2	15·68			
			75				
Koiral ...	1·0	1·00	87	87·00	182·64	1·27	1·13
	1·2	1·44	43	61·92			
	1·4	1·96	10	19·60			
	1·6	2·56	2	5·12			
	1·8	3·24	1	3·24			
	2·4	5·76	1	5·76			
			144				
Latikat ...	1·0	1·00	13	13·00	18·44	1·15	1·07
	1·2	1·44	2	2·88			
	1·6	2·56	1	2·56			
			16				
Patneiro ...	1·0	1·00	25	25·00	69·44	1·36	1·17
	1·2	1·44	16	23·04			
	1·4	1·96	7	13·72			
	1·6	2·56	3	7·68			
			51				
Toon ...	1·0	1·00	1	1·00	25·76	3·68	1·92
	1·2	1·44	1	1·44			
	1·4	1·96	1	1·96			
	2·0	4·00	1	4·00			
	2·2	4·84	1	4·84			
	2·4	5·76	1	5·76			
	2·6	6·76	1	6·76			
			7				
Gideri ...	1·0	1·00	18	18·00	67·24	1·53	1·24
	1·2	1·44	13	18·72			
	1·4	1·96	7	13·72			
	1·6	2·56	5	12·80			
	2·0	4·00	1	4·00			
			44				
Swanikat	1·0	1·00	47	47·00	149·60	1·62	1·28
	1·2	1·44	20	28·80			
	1·4	1·96	10	19·60			
	1·6	2·56	5	12·80			
	1·8	3·24	5	16·20			
	2·0	4·00	1	4·00			
	2·2	4·84	2	9·68			
	2·4	5·76	2	11·52			
			92				
Harra ...	1·0	1·00	12	12·00	69·28	1·92	1·30
	1·2	1·44	10	14·40			
	1·4	1·96	5	9·80			
	1·6	2·56	4	10·24			
	1·8	3·24	1	3·24			
	2·0	4·00	2	8·00			
	2·2	4·84	1	4·84			
	2·6	6·76	1	6·76			
			36				
Gamhari ...	1·0	1·00	4	4·00	77·88	4·33	2·08
	1·2	1·44	2	2·88			
	1·6	2·56	2	5·12			
	1·8	3·24	1	3·24			
	2·0	4·00	2	8·00			
	2·4	5·76	3	17·28			
	2·6	6·76	2	13·52			
	2·8	7·84	1	7·84			
	4·0	16·00	1	16·00			
			18				
Kawala ...	1·0	1·00	8	8·00	16·32	1·26	1·12
	1·2	1·44	4	5·76			
	1·6	2·56	1	2·56			
			13				

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Rajbirij ...	1·0	1·00	19	19·00	63·52	1·44	1·20
	1·2	1·44	16	23·04			
	1·4	1·96	5	9·80			
	1·6	2·56	3	7·68			
	2·0	4·00	1	4·00			
			44				
Amara ...	1·0	1·00	8	8·00	29·20	1·83	1·35
	1·2	1·44	2	2·88			
	1·4	1·96	1	1·96			
	1·6	2·56	2	5·12			
	1·8	3·24	1	3·24			
	2·0	4·00	2	8·00			
			16				
Simul ...	1·0	1·00	1	1·00	99·12	9·01	3·00
	1·2	1·44	1	1·44			
	1·4	1·96	2	3·92			
	1·6	2·56	1	2·5			
	3·2	10·24	1	10·24			
	3·4	11·56	1	11·56			
	3·6	12·96	1	12·96			
	3·8	14·44	1	14·44			
	4·0	16·00	1	16·00			
	5·0	25·00	1	25·00			
			11				
Kubindi ...	1·0	1·00	56	56·00	133·56	1·31	1·15
	1·2	1·44	30	43·20			
	1·4	1·96	11	21·56			
	1·6	2·56	5	12·80			
			102				
Panisaj ...	1·0	1·00	1	1·00	3·88	1·29	1·14
	1·2	1·44	2	2·88			
			3				
Panikat ...	1·0	1·00	2	2·00	3·44	1·15	1·07
	1·2	1·44	1	1·44			
			3				
Sitsal ...	1·0	1·00	3	3·00	4·44	1·11	1·05
	1·2	1·44	1	1·44			
			4				
Malota ...	1·0	1·00	1	1·00	1·00	1·00	1·00
Malla ...	1·0	1·00	1	1·00	1·00	1·00	1·00
Boirul ...	1·0	1·00	1	1·00	1·00	1·00	1·00
Poled ...	1·2	1·44	1	1·44	1·44	1·44	1·20
Wanich ...	1·0	1·00	1	1·00	2·96	1·48	1·22
	1·4	1·96	1	1·96			
			2				
Baida ...	1·2	1·44	1	1·44	1·44	1·44	1·20
Unnamed ...	1·0	1·00	1	1·00	1·00	1·00	1·00
Hiraut ...	1·0	1·00	3	3·00	3·00	1·00	1·00
Kadam ...	1·0	1·00	2	2·00	4·88	1·22	1·10
	1·2	1·44	2	2·88			
			4				
Gineri ...	1·0	1·00	1	1·00	7·80	1·56	1·25
	1·2	1·44	2	2·88			
	1·6	1·96	2	3·92			
			5				

APPENDIX 2 (a)—*concluded.*

1	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of columns 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Taki ...	1·0	1·00	6	6·00	16·48	1·65	1·28
	1·4	1·96	2	3·92			
	1·6	2·56	1	2·56			
	2·0	4·00	1	4·00			
			10				
Kala Siris	1·0	1·00	57	57·00	190·84	1·53	1·24
	1·2	1·44	37	53·28			
	1·4	1·96	17	33·32			
	1·6	2·56	7	17·92			
	1·8	3·24	3	9·72			
	2·0	4·00	2	8·00			
	2·2	4·84	1	4·84			
	2·6	6·76	1	6·76			
			125				
Safed Siris	1·0	1·00	8	8·00	22·92	1·27	1·13
	1·2	1·44	9	12·96			
	1·4	1·96	1	1·96			
			18				

	2	3	4	5	6		
Name of tree.	Diameter at 4′ from ground.	Square of diameter.	Number of trees.	Product of column 3 × 4.	Total of column 5.	Square of diameter of average tree. Quotient of column 6 by column 4.	Simple diameter of average tree.
Patpati ...	1·0	1·00	12	12·00	13·44	1·03	1·01
	1·2	1·44	1	1·44			
			13				
Lampatia	1·0	1·00	7	7·00	12·36	1·24	1·11
	1·2	1·44	1	1·44			
	1·4	1·96	2	3·92			
			10				
Totilla ...	1·0	1·00	2	2·00	4·88	1·22	1·10
	1·2	1·44	2	2·88			
			4				

APPENDIX 2 (b).

Calculation of the diameter of the average tree among the less numerously represented trees (generally those numbering less than 100).

Name of tree.	Number.		Sum of squares of the diameters of all trees [see appendix 2 (a).]		Square of average diameter.	Average diameter.
Mowa	11	143	15·84	406·56	2·84	1·68
Dabdabbi	75		192·68			
Toon	7		25·76			
Harra	36		69·28			
Simul	11		99·12			
Panisaj	3		3·88			
Kirra	53	268	71·64	433·60	1·62	1·27
Patneiro	51		69·44			
Swanikat	92		149·60			
Gamhari	18		77·88			
Kawala	13		16·32			
Safed Siris	18		22·92			
Patpati	13		13·44			
Lampatia	10		12·36			
Maidal	74	235	87·04	320·20	1·36	1·17
Latikat	16		18·44			
Gideri	44		67·24			
Rajbirij	44		63·52			
Amara	16		29·20			
Sitsal	4		4·44			
Panikat	3		3·44			
Miscellaneous	34		46·88			

APPENDIX 3.

Experiments on Type Trees and Calculation of the Growing Stock in Block I.

1	2	3	4	5	6	7	8	9	10	11	
NAME OF TREE.	Volume of bole.	Weight of wood per cubic foot.	Weight of bole.	Weight of bole. 80lbs. = 1 maund.	Weight of branch wood.	Total weight of tree.	Number of trees.	Products of columns 7 × 8. In maunds.	Products of columns 7 × 8. In lbs.	Cubic contents. Column 10 ÷ column 3.	REMARKS.
	C. ft.	lb	lb	Mds.	Mds.	Mds.		Mds.	lb	C. ft.	
Udal	51	19	969	12·11	12·78	24·89	468	11,648	931,840	49,044	The total of the measurements of the branch wood stacks in column 6 was 1,368 cubic feet, and the weighment two months after cutting up gave 526 maunds, so that in the case of branch wood in which the tree species are mixed as in this experiment (one tree of each species) a stack measuring 100 cubic feet would weigh 38 maunds.
Chilauni	77	43	3,311	41·39	30·00	71·39	682	48,698	3,895,040	90,582	
Geio	33	51	1,683	21·04	31·75	52·79	61	3,220	257,600	5,051	
Sidha	44	52	2,288	28·60	25·90	54·50	1,724	93,958	7,516,640	144,551	
Sealposra	...	47	.....	.....	17·63	17·63	194	3,420	273,600	5,821	
Sál	46	54	2,484	31·05	38·82	69·87	624	43,599	3,487,920	64,591	
Tatri	.....	49	.....	.....	42·78	42·78	983	42,053	3,364,240	68,658	
Saj	46	53	2,438	30·47	55·20	85·67	275	23,559	1,884,720	35,561	
Goehlo	.....	34	.....	.....	13·55	13·55	505	6,843	547,440	16,101	
Kala Siris	18	27	486	6·08	11·55	17.63	125	2,204	176,320	6,530	
Kubindi	10	40	400	5·00	14·00	19·00	102	1,938	155,040	3,876	
Koiral	.....	50	.....	.....	19·33	19·33	144	2,784	222,720	4,454	
Sinduri	.....	50	.....	...	16·53	16·53	163	2,694	215,520	4,310	
Kumbi	14	50	700	8·75	36·40	45·15	549	24,787	1,982,960	39,659	
Bahera	40	46	1,840	23·00	16·00	39·00	313	12,207	976,560	21,229	
Jamun	30	49	1,470	18·37	23·00	41·37	160	6,619	529,520	10,807	
Parari	19	49	931	11·64	12·08	23·72	143	3,392	271,360	5,538	
Dabdabbi (group) ...	61	(39)	.....	.....	34·67	34·67	143	4,958	396,640	10,170	
Swanikat (,,) ...	.....	(25)	.....	.....	42·25	42·25	268	11,323	905,840	36,234	
Maidal (,,) ...	.....	(25)	.....	.....	31·85	31·85	235	7,485	598,800	23,952	
Total ...	489			237·50	526·07		7,861	357,379	28,590,320	646,719	

The stock on the first periodic block=357,379 maunds, or nearly 360,000 maunds, giving a yearly capability of $\frac{360,000}{30}$ = 12,000 maunds for the first period.

The quantity to be cut annually (leaving about one-fourth of the above as a reserve fund) will be 9,000 (nine thousand) maunds.

From the above it appears that the stock is 357,379 maunds, or 646,719 cubic feet timber solid, or that one maund average firewood = 1·81 cubic feet, solid of wood ,but this factor is merely approximate because the figures used (those of column 3) give the weight per cubic foot of timber, not of branch wood, and arbitrary weights per cubic foot have been taken for the 18th, 19th, and 20th tree groups in the first column.

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